

In the Claims:

Please rewrite claim 1 in amended form, as follows:

1.(amended) A cut-resistant yarn suitable for machine knitting, comprising a core, a first wrapping about the core and a second wrapping about the first, at least one of said core, first wrapping and second wrapping being comprised of cut-resistant liquid crystal polymer fiber having a tenacity of no more than 10 grams per denier.

REMARKS

The Board rejected claims 1, 11/1, 12/11/1, 15/1, 16/11/1, 35/1, and 36/35/1 under 35 U.S.C. 103 over Bettcher 4,470,251 of record. The thrust of the rejection is that in the rejected claims in which the liquid crystal polymer fiber of no greater than 10 grams per denier is recited as a possible second wrapping, the claimed subject matter is obvious from the disclosure in Bettcher of a cut-resistant yarn in which a second wrapping is of low tenacity fiber.

Claim 1, upon which the rejected claims all relate, has been amended to make it clear that the fiber recited, and which could be the second wrap, is cut-resistant. That characteristic distinguishes over the polyester or nylon of the second wrap in the Bettcher construction, which is not regarded as cut-resistant. This is consistent with the thrust of this application, where the fiber of no greater than 10 grams per denier tenacity is cut-resistant and imparts cut-resistance to the overall yarn.

In addition, applicant traverses the rejection on the basis that one of ordinary skill in the art at the time the claimed invention was made would not have found it obvious from Bettcher to substitute polyester or nylon or other low tenacity and low cut-resistance fiber for the recited liquid crystal polymer. In support of this traverse, the declaration of Joseph Hummel accompanies

and is made a part of this response, setting forth facts that show it would not have been obvious to make the substitution proposed by the Board, and stating his opinion, as well, based on personal knowledge and long experience in the design and manufacture of cut-resistant yarn, that the substitution would not have been obvious.

As set forth in the declaration, and with reference to the publication by the manufacturer of Vectran M, the examiner will appreciate that Vectran HS and M were the only available melt spun liquid crystal polymer fibers in the world. The relative cost of Vectran M was approximately 10 to 12 times that of polyester or nylon of comparable denier. The Vectran M was marketed, not as a product comparable to nylon or polyester, but as a high performance fiber for special applications requiring high impermeability, excellent property retention over a broad temperature range, and low moisture absorption. It has a relatively high tensile modulus and is therefore disadvantageously stiffer than nylon or polyester for the mere purpose of an overwrap to provide, comfort, bulk and/or knittability. By amendment, the emphasis on the fact that the liquid crystal polymer is cut-resistant further makes it clear that one of ordinary skill in the art would not find it obvious to substitute nylon or polyester or other low tenacity fiber for it.

In view of the foregoing, applicant believes it is apparent that there would be no motivation from the Bettcher disclosure or other publication, for one of ordinary skill in the art at the time the invention was made, to use a much more expensive liquid crystal polymer fiber for a second wrap in lieu of using low cost nylon or polyester, merely because the liquid crystal polymer fiber has a low tenacity; and especially also where it could add a disadvantage of stiffness. This lack of any motivation is also borne out by the brochure of Hoechst Celanese accompanying the declaration, showing that the fiber was marketed for special applications where a high performance fiber was needed, and was not suggested for use in place of nylon or polyester.

In view of the foregoing, applicant submits that the claims rejected by

the Board are patentable over Bettcher and are properly allowable.

Applicant notes that the Board invites the examiner to consider applying other rejections of his own choosing, based on prior art already of record or additional prior art. Applicant submits that it is inappropriate for the examiner to begin prosecution anew based on prior art already of record. A final rejection by the examiner should include what the examiner regards as the best rejection based on prior art of record. To now begin again with a rejection based on art already considered is to place an undue burden and expense upon the applicant that is unwarranted. If the Board believed there was an appropriate rejection based upon cited art not relied upon, it should have made such a rejection so applicant could deal with it at this time and in this response. This suggestion by the Board encourages piecemeal prosecution to the detriment of all.

Applicant also suggests that the Board's suggestion may well not have been made if the amended claims and the facts set forth in the accompanying declaration has been before the Board.

The Board has specifically suggested that the examiner consider whether a rejection under 35 U.S.C. 112, first paragraph should be applied. Applicant submits it should not. The enablement specifically disclosed is cut-resistant fiber of liquid crystal polymer where the fiber has a tenacity of no greater than 10 grams per denier. Vectran M (a trademarked fiber by Hoechst Celanese Corp.) is specifically disclosed. As the declaration of Joseph Hummel submitted herewith states and shows the specific composition was at the time, and insofar as applicant knows, may still be, secret; and further, Vectran M was at the time, and for all applicant knows, still is, the only commercially available melt spun liquid crystal polymer fiber in the world that has a tenacity of no greater than 10 grams per denier and that proved to be cut-resistant. Accordingly, the specification is commensurate in scope with the claims. Where there is only one fiber material known at the time of the invention that falls within the scope of the claim, applicant should be permitted to claim a fiber of that material and

tenacity and its previously unrecognized character of cut-resistance, in a construction that is a new combination by virtue of the use of that fiber for a characteristic not previously recognized and that produces unobvious results.

The specification teaches to those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. Cut-resistance of a fiber can be readily determined by those skilled in the art and can even be quantified through well known published cut tests set forth in various patents to cut-resistant yarn and fiber. See, e.g., U.S. Patent No. 4,886,691 and 5,110,512, and also paragraphs 3-6 of the applicant's Rule 132 declaration, filed April 14, 1995. If there is another liquid crystal polymer of no greater than 10 grams per denier tenacity, determining whether it has the disclosed and claimed property of being cut-resistant does not require undue experimentation, but only conventional testing.

In addition, applicant calls to the examiner's attention that the approach suggested by the Board is inconsistent with previous patents issued in this art, including the cited Bettcher patent, which recites aramid fiber. There was no required showing by that disclosure that there are other aramid fibers of high tenacity that are cut-resistant. It stands to reason that if Kevlar is, so are other aramids of high tenacity. Similarly, if Vectran M of a tenacity no greater than 10 grams per denier was discovered by applicant to be cut-resistant and useful in cut-resistant yarn, then, as with Kevlar, it stands to reason that other liquid crystal polymer fibers of no greater than 10 grams per denier (if any others exist) will be cut-resistant. No different standard of disclosure should apply here. Applicant specifically directs the claims to cut-resistant liquid crystal polymer fiber of no greater than 10 grams per denier.

The approach suggested by the Board is also inconsistent with the issuance of patent No. 5,721,179 to Hoechst Celanese Corporation, where claim 1 reads:

"A cut resistant fabric comprising: a woven or knitted yarn, said yarn comprising a polyethylene fiber having a tenacity of less than 10 grams/denier."

There was no disclosure that all polyethylene fibers having a tenacity of less than 10 grams/denier would have such characteristics and function in a similar manner.

Other patents claiming cut-resistant yarns based on a particular fiber and its characteristics, e.g., 5,628,172 and 5,644,907 claiming extended chain polyester fiber as an element of a cut-resistant yarn; 5,233,821 claiming a cut-resistant garment that comprises a plurality of fibers that contain liquid crystalline polybenzoxazol or polybenzothiazole polymer selected such that the garment is cut-resistant; and 4,384,449 to a composite yarn containing aramid fiber and wire, contain nothing in the disclosures showing that all fibers of the claimed description would have the same characteristics and function in a similar manner. Apparently it has been regarded by the Office as foreseeable by those of ordinary skill in the art that other fibers of the same description will exhibit the same characteristics. So it is with liquid crystal polymer fiber of no greater than 10 grams/denier tenacity.

Moreover, insofar as applicant was aware, no other high performance liquid crystal polymer fibers of no greater than 10 grams per denier existed at the time of the invention (per the manufacturer's representation as indicated in the brochure with the accompanying declaration). Thus, applicant was not in a position to make any tests of, or representations as to, or to describe or name, other fibers of that definition; and since the detailed chemical composition was a secret, applicant was unable to characterize the material other than the manner in which the manufacturer made public. The scope of the present disclosure is consistent with the scope of issued patents, as indicated above.

Applicant submits that 35 U.S.C. 112, second paragraph, does not require more than applicant has shown to convey to those skilled in the art that fibers of liquid crystal polymer of no more than 10 grams per denier are cut-resistant and that a yarn of the composition claimed is cut-resistant. If other liquid crystal polymers exist and have a tenacity of less than 10 grams

per denier and are not cut-resistant, then the claims do not cover them. If they are, then they have the same characteristics and function in a similar manner and hence the objection that the Board suggested the examiner consider is overcome by the present amendment and response and facts submitted herewith.

Upon remand, applicant requests that the examiner reconsider and allow as amended the claims rejected by the Board and not reject claims on cited prior art or based on the requirements of 35 U.S.C. 112.

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Respectfully submitted,


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